

3. An undulated-wall honeycomb structure according to either ~~Claim 1 or 2~~ Claim 1, wherein said wall face portions formed with an undulated shape and wall face portions formed with a flat shape are formed in an intermingled fashion.

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4. An undulated-wall honeycomb structure according to any of the ~~Claims 1 through 3~~, wherein, Claim 1, regarding each of said cell passages, at least one of said plurality of walls making up said cell passage is formed with an undulated shape.

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5. An undulated-wall honeycomb structure according to any of the ~~Claims 1 through 4~~ Claim 1, wherein the undulated deformation whereby said walls are formed with an undulated shape is greater at the outer portion than at the center portion.

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6. An undulated-wall honeycomb structure according to any of the ~~Claims 1 through 5~~ Claim 1, wherein the amplitude of the undulated deformation of walls are formed with an undulated shape is 150% of the thickness of said walls or more.

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7. An undulated-wall honeycomb structure according to any of the ~~Claims 1 through 6~~ Claim 1, wherein a line

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connecting the highest portions of the protrusions and/or
the lowest portions of the recessions of the wall face
portions formed with an undulated shape in said cell passage
direction repeats a pattern of turning in the vertical
5 direction to said cell passage direction on said wall face.

8. An undulated-wall honeycomb structure according to
~~any of the Claims 1 through 7~~ Claim 3, wherein cell passages
formed by said wall face portions of said walls formed in an
undulated shape and cell passages formed by said wall face
10 portions of said walls formed in a flat shape appear and
coexist in a discontinuous manner.

9. An undulated-wall honeycomb structure according to
~~any of the Claims 1 through 8~~ Claim 3, comprising a cell
passage area A formed with a generally circular cross-
section from the center, and a cell passage area B formed
with a generally ring-shaped form at the outer side of said
cell passage area A:

20 wherein said cell passage area A contains cell
passages formed by said wall face portions of said walls
formed having an undulated shape;

and wherein said cell passage area B comprises cell
passages formed by said wall face portions of said walls
25 formed having a flat shape;

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and wherein the thickness of the walls of the cell passages within said cell passage area B is greater than the thickness of the walls of the cell passages within said cell passage area A, and also wherein the thickness thereof increases in stages from the inner circumference portion toward the outer portion portion or only increases in stages near the boundary between area B and area A.

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10. An undulated-wall honeycomb structure according
10 to ~~any of the Claims 1 through 9~~ Claim 1, wherein the material thereof is one or a composition of a plurality of the following group of ceramic materials: cordierite, alumina, mullite, lithium aluminum silicate, aluminum titanate, titania, zirconia, silicone nitride, aluminum
15 nitride, and silicon carbide; or one of the following group: stainless steel, aluminum alloy; or an adsorbent of either activated charcoal or silica gel or zeolite.

11. An undulated-wall honeycomb structure according
20 to Claim 10, wherein the porosity of the material used is between 45% to 80%.

12. A fine particle removing filter using the undulated-wall honeycomb structure according to Claim 11,
25 comprising filtering layers of walls partitioning the cell

passages, by plugging one end of particular cell passages of said undulated-wall honeycomb structure and also plugging the other end of the remaining cell passages.

5 13. A fine particle removing filter according to
Claim 12 wherein the surface roughness of the undulated
walls of said undulated-wall honeycomb structure is 10% or
more in Valley Level.

10 14. A fine particle removing filter according to
Claim 12 wherein the wall thickness of said undulated-wall
honeycomb structure is around 0.2 to 1.2 mm.

15 15. A fine particle removing filter according to
Claim 12 wherein the cell density of said undulated-wall
honeycomb structure is around 50 to 600 cpsi (cells per
square centimeter).

20 16. An undulated-wall honeycomb structure according
to ~~any one of the Claims 1 through 13~~ Claim 1, which is used
as an exhaust gas purification catalyst carrier for
vehicles, and carries catalyst on the surface on the cell
wall face and/or in micropores within the walls of said
honeycomb structure.

catalytic converters being serially alternately arrayed.

22. An exhaust gas purification catalytic converter system, wherein the exhaust gas purification catalytic converter according to Claim 19 of the undulated-wall honeycomb structure having a plurality of cell passages which are mutually parallel in channel direction; wherein intersecting portions between walls partitioning said cell passages are formed so as to maintain a predetermined width at cross-sections perpendicular to said cell passages and positioned systematically, and wherein the wall face portions of said walls excluding said intersection portions are formed so as to have an undulated shape in both the cell passage direction and the cross-sectional direction perpendicular to said cell passage direction, is placed to the upstream side of the exhaust, and the fine particle removing filter according to Claim 12 or a fine particle removing filter comprising a normal flat-wall honeycomb structure is placed to the downstream side of the exhaust.

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23. An exhaust gas purification catalytic converter system according to Claim 22, wherein each of said fine particle removing filters is a readily-exchangeable cartridge type.

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24. An exhaust gas purification system using the undulated-wall honeycomb structure according to Claim 16, for capturing fine particle substances in the exhaust gas, said exhaust gas purification system comprising:

5 means for charging said undulated-wall honeycomb structure and electrically capturing said fine particle substances.

25. An exhaust gas purification system using the
10 undulated-wall honeycomb structure according to Claim 16, for capturing fine particle substances in the exhaust gas, said exhaust gas purification system using non-thermal equilibrium plasma (non-thermal plasma) or microwave discharge plasma.

15 26. A fuel tank evaporation system using the undulated-wall honeycomb structure according to Claim 16, for suppressing external leakage of volatile components of fuel.

20 27. An exhaust gas purification system according to
~~either Claim 24 or 25~~ Claim 24, wherein said undulated-wall honeycomb structure is a readily exchangeable cartridge type configuration.

28. A fuel cell system component using the undulated-wall honeycomb structure according to Claim 16.

29. A sandwich panel using the undulated-wall
5 honeycomb structure according to Claim 16.

30. A method for manufacturing an undulated-wall
honeycomb structure, wherein a back plate having adjacent
through holes with differing material flow resistance is
10 used as a nozzle material for extrusion forming.

31. A method for manufacturing an undulated-wall
honeycomb structure according to ~~Claim 30~~ Claim 31, wherein
said back plate changes in thickness from the outer portion
15 toward the center portion.

32. A method for manufacturing an undulated-wall
honeycomb structure according to ~~either Claim 30 or 31~~ Claim
31, wherein said back plate has through holes A and through
20 holes B with differing hole diameters.

33. A method for manufacturing an undulated-wall
honeycomb structure, wherein undulations are formed in metal
foil by plasticity working beforehand, and said metal foil
25 is wrapped in a corrugated manner, thereby forming a metal